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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/715,670 | 11/17/2003 | Chiahua Ho | MXICP017 | 4806 |

25920 7590 06/15/2006

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SUNNYVALE, CA 94085

EXAMINER

PHAN, TRONG Q

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2827

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/715,670 | HO, CHIAHUA | |
| | Examiner | Art Unit | |
| | TRONG PHAN | 2827 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>5/8/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the features as recited in claims 5-7 and 18-20 (it should be noted that Figs. 4A-B and 5 of the present invention only show the plurality of MTJ devices } each connected to the respective bit line B and word line W via u-metal without any communication with a diode as recited in claims 3 and 17); the magnetic random access memory (MRAM) cell having a magnetic junction tunnel (MTJ) device with a perpendicular magnetic orientation, the first magnetization as recited in claims 8 and 10, the second magnetization as recited in claims 9 and 11, the first-in plane component and the second-in plane component as recited in claim 13 and the first-in plane component cancels out the second-in plane component as recited in claim 14 (it should be noted that Figs. 4A-B and 5 of the present invention show the magnetic random access memory (MRAM) cell 100' represented by the O ring symbol which is totally separated with the MTJ devices) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

Art Unit: 2827

is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: all variables s , d , t , r , a , b and in equation (2) on page 12 of the present invention should be defined in terms such as current, voltage, thickness, width, length, radius or else.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 5-14 and 18-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5-14 and 18-20 are not vague and indefinite since they are not readable on the respective drawings of the present invention. Because Figs. 4A-B and 5 of the

present invention show the magnetic random access memory (MRAM) cell 100' represented by the O ring symbol which is totally separated with the MTJ devices.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Gallagher et al., 5,640,343.

Gallagher et al., 5,640,343, discloses in Figs. 1A-B a MRAM cell array comprising:

Regarding claim 1 and 15:

first word line 2;

first bit line 5 perpendicular to the first word line 2;

magnetic tunnel junction (MTJ) device 8 including a free FMS layer 20 (see lines 51-52, column 6) having the direction of magnetic orientation established along the easy axis (see lines 26-27, column 4 and Fig. 9) which is parallel to the word lines (see lines 19-20, column 11) and, therefore, is perpendicular magnetic orientation with respect to the bit lines;

Regarding claims 2 and 16:

fixed ferromagnetic (FMF) layer 20 (see lines 21-22, column 4) which is read on the pinned layer; free FMS layer 20 being closer to the bit lines (4,5,6) than the fixed

Art Unit: 2827

ferromagnetic (FMF) layer 20;

Regarding claims 3 and 17:

silicon junction diode 7 disposed below magnetic tunnel junction (MTJ) device 8 and being in electrical communication with the word line (1,2, or 3) and the fixed (pinned) ferromagnetic (FMF) layer 20;

Regarding claim 4:

second bit line 4 and third bit line 6 adjacent to and on either side of the first bit line 5; second word line 1 and third word line 3 adjacent to and on either side of the first word line 2.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shukh, 6,845,038, Minakata et al., 6,504,197, and Fullerton et al., 6,650,513, for the magnetic tunnel junction (MTJ) device having perpendicular magnetization.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRONG PHAN whose telephone number is (571) 272-1794. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, AMIR ZARABIAN can be reached on (571)272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2827

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**TRONG PHAN
PRIMARY EXAMINER**



Approved
TP
6/6/06

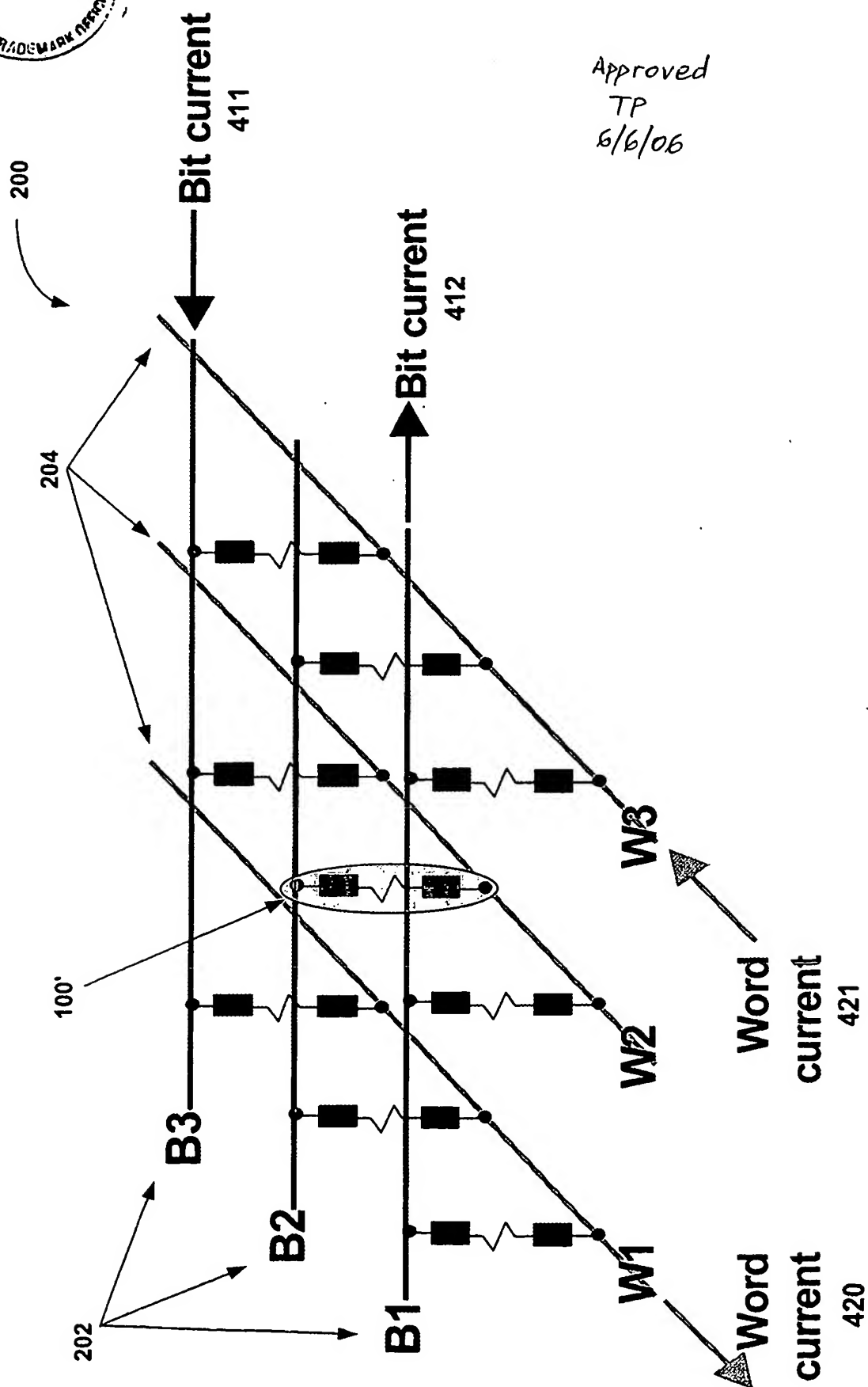


FIG. 4B

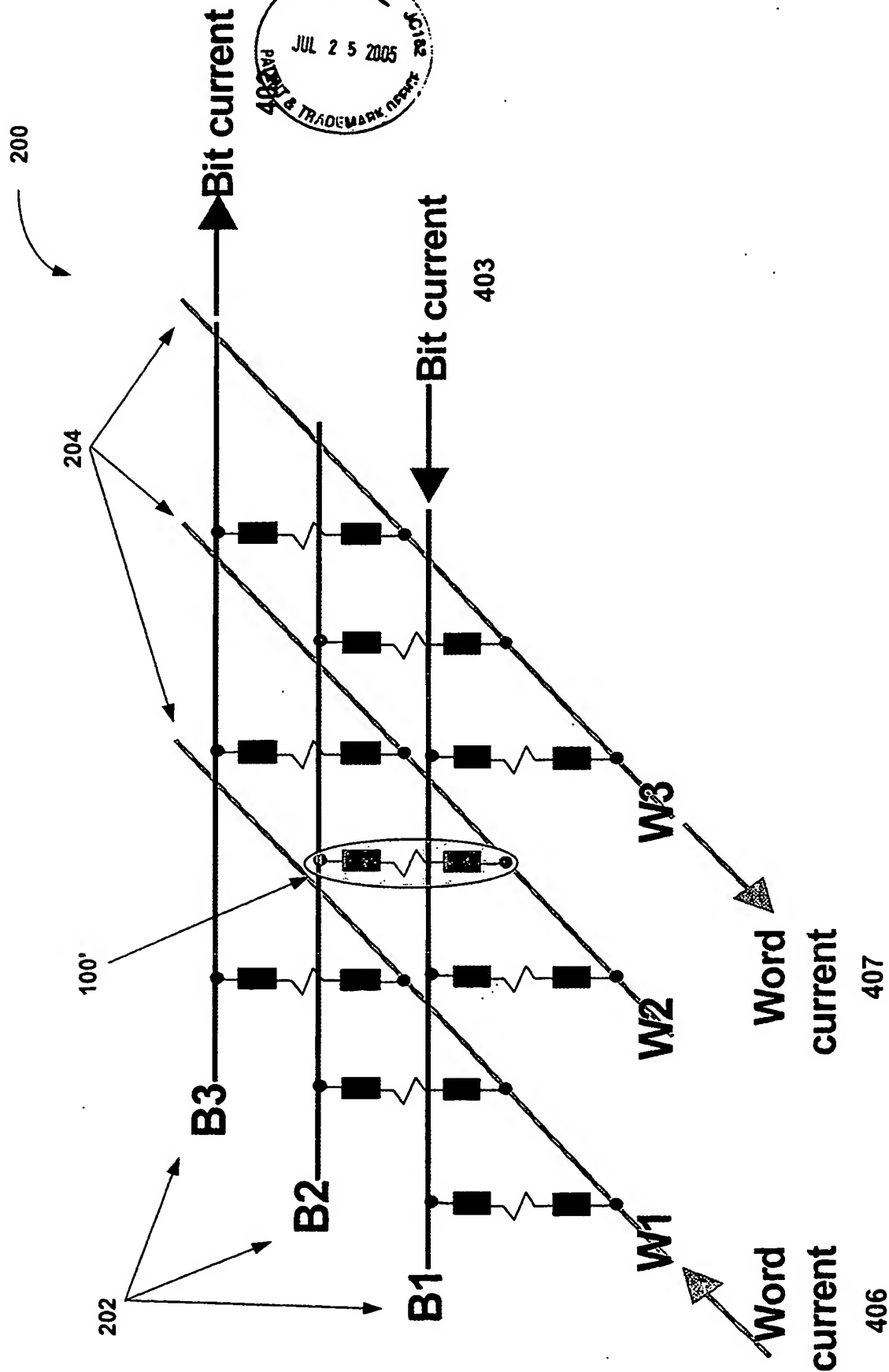
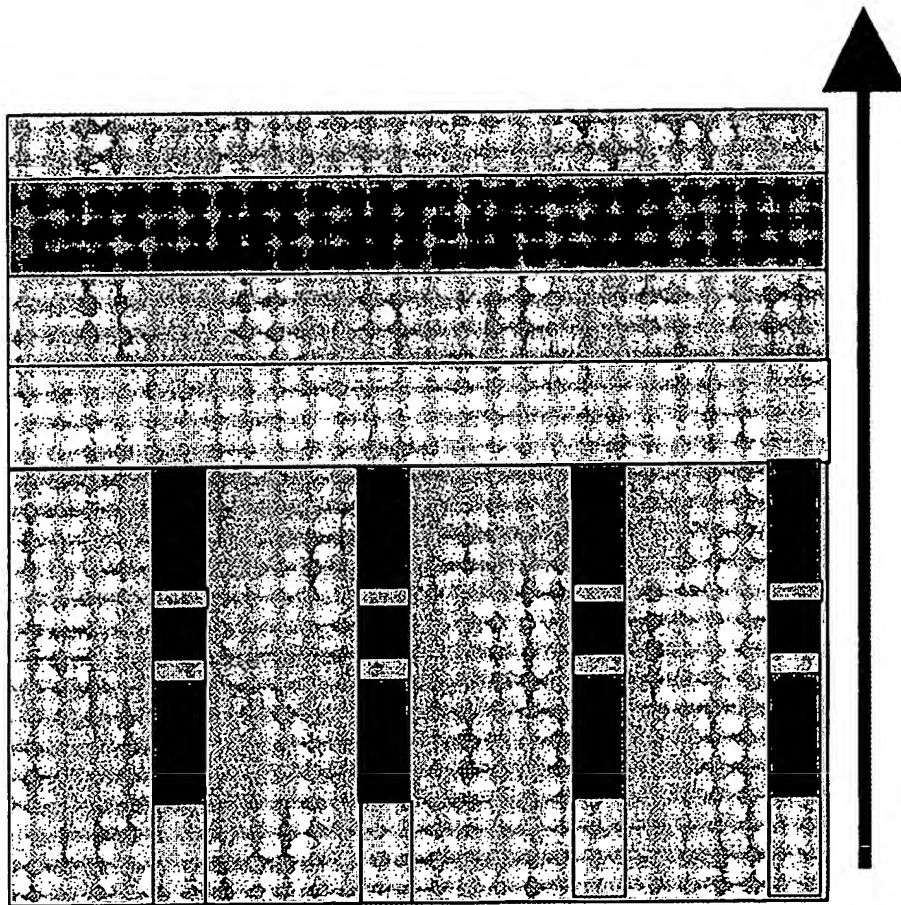


FIG. 4A

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FIG. 11B